

GTMIMAGERY Science Processing Algorithm (GTMIMAGERY_SPA) User's Guide

Version 1.5.08.04

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**GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND**

GTMIMAGERY Science Processing Algorithm

GTMIMAGERY_SPA

General

The NASA Goddard Space Flight Center's (GSFC) Direct Readout Laboratory (DRL), Code 606.3 developed this software for the International Polar Orbiter Processing Package (IPOPP). IPOPP maximizes the utility of Earth science data for making real-time decisions by giving fast access to instrument data and derivative products from the Suomi National Polar-orbiting Partnership (SNPP), Aqua, and Terra missions and, in the future, the Joint Polar Satellite System (JPSS) mission.

Users must agree to all terms and conditions in the Software Usage Agreement on the DRL Web Portal before downloading this software.

Software and documentation published on the DRL Web Portal may occasionally be updated or modified. The most current versions of DRL software are available at the DRL Web Portal:

<http://directreadout.sci.gsfc.nasa.gov/?id=software>

Questions relating to the contents or status of this software and its documentation should be addressed to the DRL via the Contact DRL mechanism at the DRL Web Portal:

<http://directreadout.sci.gsfc.nasa.gov/?id=dspContent&cid=66>

Algorithm Wrapper Concept

The DRL has developed an algorithm wrapper to provide a common command and execution interface to encapsulate multi-discipline, multi-mission science processing algorithms. The wrapper also provides a structured, standardized technique for packaging new or updated algorithms with minimal effort.

A Science Processing Algorithm (SPA) is defined as a wrapper and its contained algorithm. SPAs will function in a standalone, cross-platform environment to serve the needs of the broad Direct Readout community. Detailed information about SPAs and other DRL technologies is available at the DRL Web Portal.

Software Description

This software package contains the Visible Infrared Imaging Radiometer Suite (VIIRS) Ground Track Mercator (GTM) Imagery Science Processing Algorithm (GTMIMAGERY SPA). The GTMIMAGERY SPA produces mission-compliant HDF5 output for the GTM Imaging Band (I-Band) Imagery Environmental Data Record (EDR), GTM Moderate Band (M-Band) Imagery EDR, and GTM Near Constant Contrast (NCC) Band Imagery EDR. The SPA functions in two modes: Standalone, or as an IPOPP plug-in.

Software Version

Version 1.2 of the DRL algorithm wrapper was used to package the SPA described in this document. The GTM Imagery algorithm suite has been ported from the Interface Data Processing Segment (IDPS) OPS Version 1.5.08.04.

Enhancements to this SPA include:

- GTM Imagery algorithm suite updated to version 1.5.08.04;
- capability to process compressed and/or chunked HDF5 input files;
- capability to process single-granule SDRs and swaths (i.e., all acquired data is output per swath, including partial granules);
- interface to optionally provide a previous and next granule;
- updated Lookup Tables (LUTs).

This software will execute on a 64-bit computer and has been tested on computers with 32GB of RAM, with the following operating systems:

- a) Fedora 18 X86_64;
- b) CentOS Linux 6.4 X86_64;
- c) OpenSUSE Linux 12.1 X86_64;
- d) Kubuntu 13.04 X86_64.

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Credits

The GTM Imagery algorithm suite was provided to the DRL by the JPSS Ground Project. The DRL ported this algorithm suite for execution outside of the IDPS environment.

Prerequisites

To run this package, you must have the Java Development Kit (JDK) or Java Runtime Engine (JRE) (Java 1.6.0_25 or higher) installed on your computer, and have the Java installation bin/ subdirectory in your PATH environment variable. Also, the GTMIMAGERY SPA requires 4 GB of memory at minimum to run successfully (though more is recommended for optimal performance). This package contains 64-bit binaries statically pre-compiled on an x86-compatible 64-bit computer running under Fedora 14, using gcc 4.5.1.

Program Inputs and Outputs

This SPA includes the GTM Imagery algorithm suite comprised of the GTM I-Band, M-Band and NCC-Band Imagery EDR.

The GTM I-Band algorithm takes VIIRS Imaging Bands SDR Terrain Corrected Geolocation

HDF files and VIIRS Imaging Band SDR HDF files as inputs and outputs the VIIRS Imaging Bands EDR GTM Geolocation HDF file and VIIRS Imaging Band EDR HDF files.

The GTM M-Band algorithm takes VIIRS Moderate Band SDR Terrain Corrected Geolocation HDF files and VIIRS Moderate Resolution Band SDR HDF files as inputs and outputs the VIIRS Moderate Resolution Band EDR GTM Geolocation HDF file and VIIRS Moderate Band Imagery HDF files.

The GTM NCC-Band algorithm takes VIIRS Day Night Band Geolocation HDF files and VIIRS Day Night Band SDR HDF files as inputs and outputs the VIIRS NCC EDR GTM Geolocation HDF file and VIIRS NCC EDR HDF file.

Installation and Configuration

Installing as a Standalone Application:

Download the GTMIMAGERY_1.5.08.04_SPA_1.2.tar.gz and GTMIMAGERY_1.5.08.04_SPA_1.2_testdata.tar.gz (optional) files into the same directory.

Decompress and un-archive the GTMIMAGERY_1.5.08.04_SPA_1.2.tar.gz and GTMIMAGERY_1.5.08.04_SPA_1.2_testdata.tar.gz (optional) files:

```
$ tar -xzf GTMIMAGERY_1.5.08.04_SPA_1.2.tar.gz  
$ tar -xzf GTMIMAGERY_1.5.08.04_SPA_1.2_testdata.tar.gz
```

This will create the following subdirectories:

```
SPA  
  GTMImagery  
  algorithm  
  ancillary  
  station  
  testdata  
  testscripts  
  wrapper
```

Installing into an IPOPP Framework: This SPA can also be installed dynamically into an IPOPP framework to automate production of the GTMIMAGERY SPA data products. The SPA installation process will install SPA station(s) into IPOPP. An SPA station is an IPOPP agent that provides the mechanism necessary for running an SPA automatically within the IPOPP framework. Once this SPA is installed, users must enable the station(s) corresponding to this SPA along with any other pre-requisite station(s). Instructions for installing an SPA and enabling its stations are contained in the IPOPP User's Guide (available on the DRL Web Portal along with the IPOPP package). The SPA stations associated with this SPA are listed in Appendix A.

Software Package Testing and Validation

The testscripts subdirectory contains test scripts that can be used to verify that your current installation of the SPA is working properly, as described below. Note that the optional GTMIMAGERY_1.5.08.04_SPA_1.2_testdata.tar.gz file is required to execute these testing procedures.

Step 1: cd into the testscripts directory.

Step 2: There are three shell scripts inside the testscripts directory. To run the GTM algorithm for I-Band use:

```
$ ./run-GTM-IBand
```

A successful execution usually requires 2 minutes or more, depending on the speed of your computer and the number of granules in the input. If everything is working properly, the script will terminate with a message such as:

```
Output viirs.imgi1 is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VI1BO.h5  
Output viirs.imgi2 is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VI2BO.h5  
Output viirs.imgi3 is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VI3BO.h5  
Output viirs.imgi4 is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VI4BO.h5  
Output viirs.imgi5 is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VI5BO.h5  
Output viirs.imgigeo is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/GIGTO.h5
```

To run the GTM algorithm for M-Band use:

```
$ ./run-GTM-MBand
```

A successful execution usually requires 1 minute or more, depending on the speed of your computer and the number of granules in the input. If everything is working properly, the script will terminate with a message such as:

```
Output viirs.modm1st is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VM01O.h5  
Output viirs.modm2nd is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VM02O.h5  
Output viirs.modm3rd is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VM03O.h5  
Output viirs.modm4th is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VM04O.h5  
Output viirs.modm5th is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VM05O.h5  
Output viirs.modm6th is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VM06O.h5  
Output viirs.modmgeo is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/GMGTO.h5
```

To run the GTM algorithm for NCC-Band use:

```
$ ./run-GTM-NCCBand
```

A successful execution usually requires 1 minute or more, depending on the speed of your computer and the number of granules in the input. If everything is working properly, the script will terminate with a message such as:

```
Output viirs.vncco is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/VNCCO.h5  
Output viirs.gncco is /home/ipopp/drl/SPA/GTMIImagery/testdata/output/GNCCO.h5
```

You can cd to the output directory to verify that the science products exist. Test output product(s) are available for comparison in the testdata/output directory. These test output product(s) were generated on a 64-bit PC architecture computer running Fedora 14. The output products serve as an indicator of expected program output. Use a comparison utility (such as diff, h5diff, etc.) to compare your output product(s) to those provided in the testdata/output directory. Locally generated files may differ slightly from the provided output files because of differences in machine architecture or operating systems.

If there is a problem and the code terminates abnormally, the problem can be identified using the log files. Log files are automatically generated within the directory used for execution. They start with stdfile* and errfile*. Other log and intermediate files may be generated automatically within the directory used for execution. They are useful for traceability and debugging purposes. However it is strongly recommended that users clean up log files and intermediate files left behind in the run directory before initiating a fresh execution of the SPA. Intermediate files from a previous run may affect a successive run and produce ambiguous results. Please report any errors that cannot be fixed to the DRL.

Program Operation

In order to run the package using your own input data, you can either use the run scripts within the wrapper subdirectories, or modify the test scripts within the testscripts subdirectory.

To Use the Run Scripts

Identify the 'run' scripts: The wrapper directory within this package contains three subdirectories named GTM_IBand, GTM_MBand, and GTM_NCCBand. Each subdirectory contains an executable called 'run'. Execute 'run' within the correct wrapper subdirectory to generate the corresponding products. For instance, the 'run' within wrapper/GTM_IBand is used for creating GTM I-Band Imagery outputs. The 'run' within wrapper/GTM_MBand is used for creating GTM M-Band Imagery outputs. The 'run' within wrapper/GTM_NCCBand is used for creating GTM NCC-Band Imagery outputs. Note that to execute 'run', you need to have java on your path.

Specify input parameters using <label value> pairs: To execute the 'run' scripts, you must supply the required input and output parameters. Input and output parameters are usually file paths or other values (e.g., an automatic search flag). Each parameter is specified on the command line by a <label value> pair. Labels are simply predefined names for parameters. Each label must be followed by its actual value. Each process has its own set of <label value> pairs that must be specified in order for it to execute. Some of these pairs are optional, meaning the process would still be able to execute even if that parameter is not supplied. The two types of <label value> pairs that the GTMIMAGERY SPA uses are:

- a) Input file label/values. These are input file paths. Values are absolute or relative paths to the corresponding input file.
- b) Output file label/values. These are output files that are produced by the SPA. Values are absolute or relative paths of the files you want to generate.

The GTMIMAGERY SPA provides an optional interface for cross-granule Geolocation and SDR file inputs to the GTM Imagery algorithms. Use of previous/next SDR granules improves processing at the GTM granule boundaries of the output products. The granule start/end boundaries of the optional cross-granule file inputs must be temporally adjacent (not overlapping) to the granule start/end boundaries of the primary file inputs. The "previous" SDR set should be the one that is adjacent and precedes the first granule of the primary file input set while the "next" SDR set should be the one that is adjacent and follows the last granule of the primary file input set.

To provide the optional cross-granule Geolocation/SDR file inputs, the files need to be specified as input parameters by using the optional ".prev" and ".next" file labels; file labels designated as ".prev" correspond to cross-granule files that are temporally adjacent to the first granule of the primary input files, and ".next" correspond to cross-granule files temporally adjacent to the last granule of the primary input files. The following tables contain all file labels, and their descriptions, used by the GTMIMAGERY SPA.

Input File Labels	Description	Source
GTM I-Band Imagery		
viirs.gitco Optional: viirs.gitco.prev viirs.gitco.next	VIIRS Imaging Bands SDR Terrain Corrected Geolocation HDF file path	DRL ftp site for real-time VIIRS SDR over the eastern US region: ftp://is.sci.gsfc.nasa.gov/gsfcdata/npp/viirs/level1/GITCO_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 Where yyyy, mm, dd represents the year, month, and day of month for the start of the swath; the first hh, mm, ss, S represents the hour, minutes, seconds, and 10th of a second for the start of the swath and the second hh, mm, ss, S represents the end time of the swath.
viirs.svi01 Optional: viirs.svi01.prev viirs.svi01.next	VIIRS Imaging Band 01 SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/npp/viirs/level1/SVI01_npp_dyyyymmd_thhmmssS_ehhmmssS*.h5
viirs.svi02 Optional: viirs.svi02.prev viirs.svi02.next	VIIRS Imaging Band 02 SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/npp/viirs/level1/SVI02_npp_dyyyymmd_thhmmssS_ehhmmssS*.h5
viirs.svi03 Optional: viirs.svi03.prev viirs.svi03.next	VIIRS Imaging Band 03 SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/npp/viirs/level1/SVI03_npp_dyyyymmd_thhmmssS_ehhmmssS*.h5
viirs.svi04 Optional: viirs.svi04.prev viirs.svi04.next	VIIRS Imaging Band 04 SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/npp/viirs/level1/SVI04_npp_dyyyymmd_thhmmssS_ehhmmssS*.h5
viirs.svi05 Optional: viirs.svi05.prev viirs.svi05.next	VIIRS Imaging Band 05 SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/npp/viirs/level1/SVI05_npp_dyyyymmd_thhmmssS_ehhmmssS*.h5
Input File Labels	Description	Source
GTM M-Band Imagery		
viirs.gmtco Optional: viirs.gmtco.prev viirs.gmtco.next	VIIRS Moderate Band SDR Terrain Corrected Geolocation HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/npp/viirs/level1/GMTCO_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.svm01 Optional: viirs.svm01.prev viirs.svm01.next	VIIRS Moderate Resolution Band 01 SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/npp/viirs/level1/SVM01_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.svm04 Optional:	VIIRS Moderate Resolution Band 04 SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/npp/viirs/level1/SVM04_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5

viirs.svm04.prev viirs.svm04.next		
viirs.svm09 Optional: viirs.svm09.prev viirs.svm09.next	VIIRS Moderate Resolution Band 09 SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/np p/viirs/level1/SVM09_npp_dyyyymm dd_thhmmssS_ehhmmssS*.h5
viirs.svm14 Optional: viirs.svm14.prev viirs.svm14.next	VIIRS Moderate Resolution Band 14 SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/np p/viirs/level1/SVM14_npp_dyyyymm dd_thhmmssS_ehhmmssS*.h5
viirs.svm15 Optional: viirs.svm15.prev viirs.svm15.next	VIIRS Moderate Resolution Band 15 SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/np p/viirs/level1/SVM15_npp_dyyyymm dd_thhmmssS_ehhmmssS*.h5
viirs.svm16 Optional: viirs.svm16.prev viirs.svm16.next	VIIRS Moderate Resolution Band 16 SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/np p/viirs/level1/SVM16_npp_dyyyymm dd_thhmmssS_ehhmmssS*.h5
Input File Labels GTM NCC Imagery	Description	Source
viirs.gdnbo Optional: viirs.gdnbo.prev viirs.gdnbo.next	VIIRS Day Night Band Geolocation HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/np p/viirs/level1/GDNBO_npp_dyyyym mdd_thhmmssS_ehhmmssS*.h5
viirs.svndnb Optional: viirs.svndnb.prev viirs.svndnb.next	VIIRS Day Night Band SDR HDF file path	ftp://is.sci.gsfc.nasa.gov/gsfcdata/np p/viirs/level1/SVDNB_npp_dyyyym mdd_thhmmssS_ehhmmssS*.h5

Output File Labels GTM I-Band Imagery	Description	Destination (when SPA is installed in IPOPP)
viirs.imgigeo	VIIRS Imaging Bands EDR GTM Geolocation HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/GIGTO_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5 Where yyyy, mm, dd represents the year, month, and day of month for the start of the swath; the first hh, mm, ss, S represents the hour, minutes, seconds, and 10th of a second for the start of the swath and the second hh, mm, ss, S represents the end time of the swath.
viirs.imgi1	VIIRS Imaging Band 01 EDR HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/VI1BO_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.imgi2	VIIRS Imaging Band 02 EDR HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/VI2BO_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.imgi3	VIIRS Imaging Band 03 EDR HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/VI3BO_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.imgi4	VIIRS Imaging Band 04 EDR HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/VI4BO_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.imgi5	VIIRS Imaging Band 05 EDR HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/VI5BO_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
Output File Labels GTM M-Band Imagery	Description	Destination (when SPA is installed in IPOPP)
viirs.modmgeo	VIIRS Moderate Band GTM Imagery Geolocation HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/GMGTO_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.modm1st	VIIRS Moderate Band M1ST Imagery HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/VM01O_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.modm2nd	VIIRS Moderate Band M2ND Imagery HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/VM02O_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.modm3rd	VIIRS Moderate Band M3RD Imagery HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/VM03O_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.modm4th	VIIRS Moderate Band M4TH Imagery HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/VM04O_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.modm5th	VIIRS Moderate Band M5TH Imagery HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/VM05O_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
viirs.modm6th	VIIRS Moderate Band M6TH Imagery HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/VM06O_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5
Output File Labels GTM NCC Imagery	Description	Destination (when SPA is installed in IPOPP)
viirs.gncco	VIIRS NCC EDR GTM Geolocation HDF file path	/raid/pub/gsfcdtdata/npp/viirs/level2/GNCCO_npp_dyyyymdd_thhmmssS_ehhmmssS*.h5

viirs.vncco	VIIRS NCC EDR HDF file path	/raid/pub/gsfcdatal/npp/viirs/level2/VNCCO_n pp_dyyyymmdd_thhmmssS_ehhmmsS*.h5
-------------	-----------------------------	---

NOTES:

1. The GTM M-Band algorithm processes six of the sixteen Moderate Band (M-Band) inputs, resulting in the production of six output M-Band EDRs, as does the operational IDPS. The default bands are M1, M4, M9, M14, M15, and M16 as described in the Operational Algorithm Description (OAD) document. The VIIRS Imaging Band 01 EDR, VIIRS Imaging Band 02 EDR, VIIRS Imaging Band 03 EDR, VIIRS Moderate Band M1ST Imagery, VIIRS Moderate Band M2ND Imagery and VIIRS Moderate Band M3RD Imagery output products are not generated during night time.
2. In order for the GTM Imagery algorithms to use the optional cross-granule files for processing, all of the ".prev" and/or ".next" file inputs must be provided. For example, in the case of GTM I-Band, the ".prev" cross-granule files will only be used for processing if viirs.gitco.prev, viirs.svi01.prev, viirs.svi02.prev, viirs.svi03.prev, viirs.svi04.prev, and viirs.svi05.prev were all provided to the algorithm. An "all-or-nothing" approach is used in which all ".prev" and/or ".next" must be provided, or none of them are used during processing.
3. When installed into the IPOPP framework, the GTMIMAGERY SPA stations (see Appendix A) are designed to automatically search for applicable previous and next cross-granule inputs among all currently registered SDR files.
4. Please note that the DRL ftp site currently hosts direct-broadcast VIIRS SDRs only, and may not have temporally-adjacent VIIRS SDRs available for download. Temporally-adjacent VIIRS SDRs may be ordered from www.class.noaa.gov

Execute the 'run': The following scripts show examples of the command line to run the GTM I-Band algorithm from the testscripts directory, with the previous and next SDR set provided using the optional input file labels:

```
$ ./wrapper/GTM_IBand/run \
viirs.svi01.prev ..../testdata/input/SVI01_npp_d20140731_t1925098_e1926339_b14293_c20140801210503514473_noaa_ops.h5 \
viirs.svi01 ..../testdata/input/SVI01_npp_d20140731_t1926352_e1927576_b14293_c20140801210503514473_noaa_ops.h5 \
viirs.svi01.next ..../testdata/input/SVI01_npp_d20140731_t1927588_e1929230_b14293_c20140801210534196243_noaa_ops.h5 \
viirs.svi02.prev ..../testdata/input/SVI02_npp_d20140731_t1925098_e1926339_b14293_c20140801210451177587_noaa_ops.h5 \
viirs.svi02 ..../testdata/input/SVI02_npp_d20140731_t1926352_e1927576_b14293_c20140801210451177587_noaa_ops.h5 \
viirs.svi02.next ..../testdata/input/SVI02_npp_d20140731_t1927588_e1929230_b14293_c20140801210523674380_noaa_ops.h5 \
viirs.svi03.prev ..../testdata/input/SVI03_npp_d20140731_t1925098_e1926339_b14293_c20140801210510462443_noaa_ops.h5 \
viirs.svi03 ..../testdata/input/SVI03_npp_d20140731_t1926352_e1927576_b14293_c20140801210510462443_noaa_ops.h5 \
viirs.svi03.next ..../testdata/input/SVI03_npp_d20140731_t1927588_e1929230_b14293_c20140801210552518811_noaa_ops.h5 \
viirs.svi04.prev ..../testdata/input/SVI04_npp_d20140731_t1925098_e1926339_b14293_c20140801210455445217_noaa_ops.h5 \
viirs.svi04 ..../testdata/input/SVI04_npp_d20140731_t1926352_e1927576_b14293_c20140801210455445217_noaa_ops.h5 \
viirs.svi04.next ..../testdata/input/SVI04_npp_d20140731_t1927588_e1929230_b14293_c20140801210534982875_noaa_ops.h5 \
viirs.svi05.prev ..../testdata/input/SVI05_npp_d20140731_t1925098_e1926339_b14293_c20140801210511618323_noaa_ops.h5 \
viirs.svi05 ..../testdata/input/SVI05_npp_d20140731_t1926352_e1927576_b14293_c20140801210511618323_noaa_ops.h5 \
viirs.svi05.next ..../testdata/input/SVI05_npp_d20140731_t1927588_e1929230_b14293_c20140801210526496409_noaa_ops.h5 \
viirs.gitco.prev ..../testdata/input/GITCO_npp_d20140731_t1925098_e1926339_b14293_c20140801210517867741_noaa_ops.h5 \
viirs.gitco ..../testdata/input/GITCO_npp_d20140731_t1926352_e1927576_b14293_c20140801210517867741_noaa_ops.h5 \
viirs.gitco.next ..../testdata/input/GITCO_npp_d20140731_t1927588_e1929230_b14293_c20140801210555796168_noaa_ops.h5 \
viirs.img1 ..../testdata/output/VI1BO.h5 \
viirs.img2 ..../testdata/output/VI2BO.h5 \
viirs.img3 ..../testdata/output/VI3BO.h5 \
```

```
viirs.imgi4 ./testdata/output/VI4BO.h5 \
viirs.imgi5 ./testdata/output/VI5BO.h5 \
viirs.imgigeo ./testdata/output/GIGTO.h5
```

The following scripts show examples of the command line to run the GTM M-Band algorithm from the testscripts directory, with the previous and next SDR set provided using the optional input file labels:

```
$ ./wrapper/GTM_MBAND/run \
viirs.svm01.prev ./testdata/input/SVM01_npp_d20140731_t1925098_e1926339_b14293_c20140801210446232096_noaa_ops.h5 \
viirs.svm01 ... ./testdata/input/SVM01_npp_d20140731_t1926352_e1927576_b14293_c20140801210446232096_noaa_ops.h5 \
viirs.svm01.next ... ./testdata/input/SVM01_npp_d20140731_t1927588_e1929230_b14293_c20140801210513616007_noaa_ops.h5 \
viirs.svm04.prev ./testdata/input/SVM04_npp_d20140731_t1925098_e1926339_b14293_c20140801210449151456_noaa_ops.h5 \
viirs.svm04 ... ./testdata/input/SVM04_npp_d20140731_t1926352_e1927576_b14293_c20140801210449151456_noaa_ops.h5 \
viirs.svm04.next ./testdata/input/SVM04_npp_d20140731_t1927588_e1929230_b14293_c20140801210513950966_noaa_ops.h5 \
viirs.svm09.prev ./testdata/input/SVM09_npp_d20140731_t1925098_e1926339_b14293_c20140801210453436404_noaa_ops.h5 \
viirs.svm09 ... ./testdata/input/SVM09_npp_d20140731_t1926352_e1927576_b14293_c20140801210453436404_noaa_ops.h5 \
viirs.svm09.next ... ./testdata/input/SVM09_npp_d20140731_t1927588_e1929230_b14293_c20140801210528963835_noaa_ops.h5 \
viirs.svm14.prev ./testdata/input/SVM14_npp_d20140731_t1925098_e1926339_b14293_c20140801210507380964_noaa_ops.h5 \
viirs.svm14 ... ./testdata/input/SVM14_npp_d20140731_t1926352_e1927576_b14293_c20140801210507380964_noaa_ops.h5 \
viirs.svm14.next ... ./testdata/input/SVM14_npp_d20140731_t1927588_e1929230_b14293_c20140801210534160413_noaa_ops.h5 \
viirs.svm15.prev ./testdata/input/SVM15_npp_d20140731_t1925098_e1926339_b14293_c20140801210511055812_noaa_ops.h5 \
viirs.svm15 ... ./testdata/input/SVM15_npp_d20140731_t1926352_e1927576_b14293_c20140801210511055812_noaa_ops.h5 \
viirs.svm15.next ... ./testdata/input/SVM15_npp_d20140731_t1927588_e1929230_b14293_c20140801210545061023_noaa_ops.h5 \
viirs.svm16.prev ./testdata/input/SVM16_npp_d20140731_t1925098_e1926339_b14293_c20140801210507380999_noaa_ops.h5 \
viirs.svm16 ... ./testdata/input/SVM16_npp_d20140731_t1926352_e1927576_b14293_c20140801210507380999_noaa_ops.h5 \
viirs.svm16.next ... ./testdata/input/SVM16_npp_d20140731_t1927588_e1929230_b14293_c20140801210549392520_noaa_ops.h5 \
viirs.gmtco.prev ./testdata/input/GMTCO_npp_d20140731_t1925098_e1926339_b14293_c20140801210443328115_noaa_ops.h5 \
viirs.gmtco ... ./testdata/input/GMTCO_npp_d20140731_t1926352_e1927576_b14293_c20140801210443328115_noaa_ops.h5 \
viirs.gmtco.next ... ./testdata/input/GMTCO_npp_d20140731_t1927588_e1929230_b14293_c20140801210528846599_noaa_ops.h5 \
viirs.modm1st ... ./testdata/output/VM01.O.h5 \
viirs.modm2nd ... ./testdata/output/VM02.O.h5 \
viirs.modm3rd ... ./testdata/output/VM03.O.h5 \
viirs.modm4th ... ./testdata/output/VM04.O.h5 \
viirs.modm5th ... ./testdata/output/VM05.O.h5 \
viirs.modm6th ... ./testdata/output/VM06.O.h5 \
viirs.modmgeo ... ./testdata/output/GMGTO.h5
```

The following scripts show examples of the command line to run the GTM NCC-Band algorithm from the testscripts directory, with the previous and next SDR set provided using the optional input file labels:

```
$ ./wrapper/GTM_NCCBand/run \
viirs.svdbn.prev ./testdata/input/SVDBNB_npp_d20140731_t1925098_e1926339_b14293_c20140801210517847038_noaa_ops.h5 \
viirs.svdbn ... ./testdata/input/SVDBNB_npp_d20140731_t1926352_e1927576_b14293_c20140801210517847038_noaa_ops.h5 \
viirs.svdbn.next ... ./testdata/input/SVDBNB_npp_d20140731_t1927588_e1929230_b14293_c20140801210548287787_noaa_ops.h5 \
viirs.gdnbo.prev ./testdata/input/GDNBO_npp_d20140731_t1925098_e1926339_b14293_c20140801210517847038_noaa_ops.h5 \
viirs.gdnbo ... ./testdata/input/GDNBO_npp_d20140731_t1926352_e1927576_b14293_c20140801210533774004_noaa_ops.h5 \
viirs.gdnbo.next ... ./testdata/input/GDNBO_npp_d20140731_t1927588_e1929230_b14293_c20140801210548287787_noaa_ops.h5 \
viirs.vncco ... ./testdata/output/VNCCO.h5 \
viirs.gncco ... ./testdata/output/GNCCO.h5
```

A successful execution usually requires 5 minutes or more for all the three scripts, depending on the speed of your computer and the number of granules in the input. If execution fails, you will see an error message indicating the cause of failure (e.g., a file cannot be found, or a label cannot be recognized). Correct it and run again. If the problem has some other cause, it can be identified using the log files. The 'run' can be executed from any directory the user chooses. This can be done by prefixing it with the file path for the 'run' script.

To Use the Scripts in the testscripts Directory

One simple way to run the algorithms from the directory of your choice using your own data is to copy the desired script (e.g., run-GTM-IBand, in order to run GTM I-Band) from the testscripts directory to the selected directory. Change the values of the variables like WRAPPERHOME, INPUTHOME and OUTPUTHOME to reflect the file paths of the wrapper directories and the input/output file paths. Then modify the input/output file name variables. Run the script to process your data.

Appendix A

SPA Stations

Installation of this SPA in IPOPP mode will make the SPA stations listed in Table A-1 available to IPOPP. These stations along with any other pre-requisite stations (listed in Table A-2) will need to be enabled to allow IPOPP to automate production of the GTMIMAGERY SPA data products. Further, users who wish to generate image products from the data products generated by this SPA will need to enable the image-generating stations listed in Table A-3. The SPAs containing the pre-requisite and the image-generating stations listed in Tables A-2 and A-3 can be downloaded from the DRL Web Portal, in case they are not already available in your IPOPP installation. Details about these other SPAs are available in the respective SPA User's Guides. Please refer to the IPOPP User's Guide for instructions on how to install an SPA in IPOPP and enable the corresponding stations.

Table A-1. SPA Stations

SPA stations for this SPA	Data products produced
GTM_IBand	GIGTO_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 VI1BO_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 (Daytime only) VI2BO_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 (Daytime only) VI3BO_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 (Daytime only) VI4BO_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 VI5BO_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5
GTM_MBand	GMGTO_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 VM01O_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 (Daytime only) VM02O_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 (Daytime only) VM03O_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 (Daytime only) VM04O_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 VM05O_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 VM06O_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5
GTM_NCCBAND	GNCCO_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5 VNCCO_npp_dyyyymmdd_thhmmssS_ehhmmssS*.h5

Table A-2. Pre-requisite Stations

Pre-requisite SPA stations	SPA in which they are available
VIIRS_C-SDR	C-SDR_SPA
or	
VIIRS-SDR	VIIRS-SDR_SPA

WARNING: The stations VIIRS-SDR and VIIRS_C-SDR must never be run simultaneously.

Table A-3. Image-generating Stations

Image-generating stations	SPA in which they are available
vimgifcolor-geotiff	H2G_SPA
vimgmfcolor-geotiff	H2G_SPA
vimgncc-geotiff	H2G_SPA

NOTE: Please refer to the H2G_SPA User's Guide for more details about the image products, including their locations and filename patterns when they are generated in IPOPP.